Predicting Patient Dissatisfaction Following Joint Replacement Surgery

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ABSTRACT. ***Objective.*** The incidence of patient-reported dissatisfaction following total joint arthroplasty can be up to 30%. Our aim was to identify the preoperative patient-level predictors of patient dissatisfaction 1 year after surgery.

Methods. We surveyed 1720 patients undergoing primary hip or knee replacement surgery. Relevant covariates including demographic data, body mass index, sex, comorbidities, and education were recorded. Joint functional status and patient quality of life were assessed at baseline and at 1-year followup with the Western Ontario McMaster University Osteoarthritis Index (WOMAC) and Medical Outcomes Study Short Form-36 (SF-36) scales, respectively. Patient satisfaction with surgery was determined with 4 survey questions at 1-year followup.

Results. There were no significant differences in demographic data between satisfied (n = 1290) and dissatisfied patients (n = 430). Logistic regression modeling showed that a lower preoperative SF-36 Mental Health score independently predicted patient dissatisfaction with surgery, adjusted for all relevant covariates ($p < 0.05$). We found no correlation between patient satisfaction and WOMAC change scores at 1-year followup ($p = 0.31$).

Conclusion. Preoperative mental health is an important factor to consider when understanding patient satisfaction with surgery. Interventions to reduce psychological distress prior to surgery should be studied to determine if they may improve subjective outcomes of patients undergoing joint replacement surgery. (First Release Nov 1 2008; J Rheumatol 2008;35:2415–8; doi:10.3899/jrheum.080295)

Key Indexing Terms:
ARTHROPLASTY SATISFACTION MENTAL HEALTH OUTCOMES

The goal of total joint arthroplasty (TJA) is to produce a stable, painless joint with an adequate range of motion for activities of daily living. Numerous studies have shown that TJA provides significant pain relief and improvement in patient quality of life[1-4]. Patient satisfaction is increasingly being used as a measure of the patient's perception of the success of TJA, as this subjective outcome has been shown to be only modestly correlated to physician assessment of outcomes[5-7].

Patient satisfaction with surgery is likely multifactorial and may be influenced by the patient's mobility, expectations of surgery, physical condition, or length of the incision[8-10]. However, patient satisfaction may also be affected by factors that seem unrelated to the surgical intervention itself, such as the patient-surgeon relationship and the process of care, both in hospital and after discharge[11,12]. Investigators have reported patient dissatisfaction rates after TJA varying between 8% and 30%[4,9-15]. It is thought that the true incidence may actually be higher than reported, as patients are reluctant to report dissatisfaction and to seem ungrateful to the medical staff[16].

Our primary objective was to identify the preoperative patient-level predictors of dissatisfaction 1 year following TJA.

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MATERIALS AND METHODS

Study patients were recruited from a single Canadian academic institution, the Toronto Western Hospital, before undergoing primary hip or knee replacement surgery. Our inclusion criteria for the study were patient age of 18 years and above and a diagnosis of primary or secondary osteoarthritis.

All patients gave informed consent to participate in the study. All data were collected by an independent assessor not involved in the medical care of the patients. The study protocol was approved by the local ethics committee.

Collection of data. Baseline demographic data of age, sex, body mass index (BMI), and level of education were recorded. Highest level of education was recorded as either higher education level (university or above) or low education level (high school or below). Baseline medical health was scored on the Charlson Comorbidity Illness Index[17]. Given the low incidence of comorbidity in this sample, the data were collapsed into 4 categories, a score of 0, 1, 2, or ≥ 3. Functional status and pain level were assessed preoperatively and at 1-year followup with the Western Ontario McMaster University Osteoarthritis Index (WOMAC) function and pain scores, respectively[18]. A greater score on the WOMAC scale represents poorer function or greater pain. Patient quality of life was assessed by the Medical Outcomes Study Short-Form 36 (SF-36) preoperatively and at 1-year followup[19-21].

Patient satisfaction was assessed with 4 survey questions scored on a 4-point Likert scale with optional responses of very satisfied (VS), somewhat satisfied (SS), somewhat dissatisfied (SD), or very dissatisfied (VD). Patients were asked about their satisfaction with the care they received around surgery, the amount of pain relief obtained, their ability to perform their activities of daily living such as home or yard work, and their ability to do recreational activities. These domains have all been reported as reasons for patients to undergo joint replacement surgery[22].

Statistical analysis. Continuous data such as age, BMI, SF-36 domains, and WOMAC pain and function scores were compared between groups using t-tests. Means and standard deviations are reported for all continuous variables. Binary data such as sex, level of education, and Charlson scores are reported with frequencies, and groups were compared with the corrected chi-square test.

We calculated the Cronbach's alpha coefficient to ensure validity of summing the individual scores from the satisfaction questions into one total satisfaction score. Cronbach's alpha measures how well a set of variables measures a single construct. It is not a statistical test but rather a coefficient of reliability (or consistency)[23]. The coefficient was 0.82 and was therefore valid to sum the individual satisfaction scores into one total score.

We then divided the total satisfaction scores into quartiles and the top quartile of scores was considered the dissatisfied patients.

Multivariate logistic regression modeling was used to determine the predictive factors for patient dissatisfaction following TJA. The independent variables assessed were patient age, sex, BMI, comorbidity, level of education, surgery performed (hip vs knee replacement), preoperative WOMAC, and SF-36 scores.

Pearson's correlation coefficient was determined to evaluate the relationship between the total satisfaction scores and the total WOMAC change score. The WOMAC change score was calculated as difference between the 1-year total WOMAC score and the preoperative total WOMAC score. Significance was set at $p < 0.05$ to validate the correlation coefficient.

All statistical analyses were done with SPSS version 13.0 (SPSS, Chicago, IL, USA). Beta coefficients for regression modeling and their 95% confidence intervals are reported. All reported p values are 2-tailed with an alpha of 0.05.

RESULTS

In our registry, we had complete data on 1720 out of 2300 (74.8%) patients that comprised our study cohort. Patients with complete data were not significantly different from patients with incomplete data in age, BMI, sex, or Charlson Index.

There were no significant differences in demographic data between the groups of satisfied and dissatisfied patients (Table 1). The response distributions of the individual questions and corresponding Mental Health (MH) scores are shown in Table 2.

Table 3 shows that there were no differences in WOMAC scores between the satisfied and dissatisfied patients at baseline or at 1-year followup ($p > 0.05$). The satisfied group reported significantly higher scores on the SF-36 domains of Vitality and MH and Mental Component Scales (MCS) before surgery (a higher score representing a better health state) and a strong trend toward better General Health. At 1-year followup, the satisfied group again had significantly higher MH and MCS scores.

Logistic regression modeling showed that a lower preoperative MH score independently predicted patient dissatis-

Table 1. Demographic data comparing satisfied and unsatisfied patients.

Feature	Satisfied, n = 1290	Dissatisfied, n = 430	p
Age (SD), yrs	69.8 (11.9)	69.0 (12.7)	0.23
BMI (SD)	30.3 (6.5)	30.4 (6.6)	0.81
Male, %	41.7	41.1	0.86
Higher education, %	50.8	55.4	0.13
Charlson Index, %			
0	741	185	0.31
1	379	105	
2	138	48	
≥ 3	78	18	

BMI: body mass index.

Table 2. Response distribution for satisfaction questions and Mental Health (MH) scores. VS: very satisfied; SS: somewhat satisfied; SD: somewhat disappointed; VD: very disappointed.

Measure	Response Distribution, %	Mental Health Score (SD)
Satisfaction with care at time of surgery		
VS/SS	92.2	60.9 (22.8)
SD/VD	7.8	58.8 (23.6)
Satisfaction with pain relief from surgery		
VS/SS	92.4	60.7 (22.9)
SD/VD	7.6	60.0 (21.9)
Satisfaction with ability to do home or yard work		
VS/SS	85.5	61.1 (23.5)
SD/VD	14.5	57.5 (24.2)
Satisfaction with improving ability for recreational activity		
VS/SS	81.4	61.2 (23.3)
SD/VD	18.6	60.6 (22.8)

Table 3. Preoperative and 1-year WOMAC and SF-36 scores comparing satisfied and dissatisfied patients.

Measure	Satisfied, n = 1290 (SD)	Dissatisfied, n = 430 (SD)	p
Preop WOMAC scores			
WOMAC total	53.1 (18.4)	53.6 (18.6)	0.59
WOMAC pain	10.7 (4.0)	10.8 (4.1)	0.76
1-year WOMAC scores			
WOMAC total	22.4 (17.5)	20.4 (17.3)	0.1
WOMAC pain	3.6 (3.5)	3.5 (3.3)	0.67
Preoperative SF-36			
Vitality	47.1 (21.9)	44.7 (21.5)	0.04
General health	59.4 (21.2)	57.3 (20.9)	0.06
Mental health	61.5 (23.9)	57.6 (23.9)	0.002
Physical functioning	21.6 (22.1)	22.3 (20.5)	0.51
Social functioning	49.7 (27.1)	47.9 (27.3)	0.22
Mental component scale	54.4 (17.3)	50.3 (15.9)	0.004
1-year SF-36			
Vitality	54.1 (21.6)	54.0 (18.8)	0.95
General health	61.4 (22.0)	61.5 (20.3)	0.94
Mental health	65.9 (23.9)	62.5 (24.1)	0.03
Physical functioning	39.6 (26.8)	44.7 (34.5)	0.19
Social functioning	68.0 (28.4)	69.2 (28.2)	0.57
Mental component scale	61.2 (18.0)	55.3 (16.7)	0.007

faction at 1 year after surgery after adjustment for all demographic covariates (p = 0.006; Table 4).

Pearson's correlation coefficient between patient dissatisfaction and total WOMAC change scores at 1 year was 0.031 (p = 0.31).

DISCUSSION

We found that patients reporting greater mental health dysfunction prior to surgery were more likely to be dissatisfied with their arthroplasty 1 year after surgery, independent of whether they had a hip or knee replacement. Moreover, we found no correlation between patient satisfaction and the WOMAC change scores following TJA. Others have shown a similar finding, whereby patient satisfaction did not correlate with functional outcome[13].

Consistent with our findings, others have shown that age or sex do not correlate with patient satisfaction after joint replacement surgery[4,9,13,14]. One study showed that lower education and a greater BMI predicted less satisfaction with knee replacement surgery; however, these factors were not significant in our data set[4].

The importance of mental health in predicting pain and functional outcomes of joint replacement surgery has been shown in a few studies[9,15,24-26]. Psychological distress measured by the Mental Health score of the SF-36 has been shown by one group to predict greater WOMAC pain and joint dysfunction scores following knee arthroplasty[27]. Our study is the first to demonstrate that preoperative mental health is a significant factor in understanding patient satisfaction following joint replacement surgery.

In our dataset we found that prior to surgery, the dissatisfied patients scored below the age and gender-based median for mental health scores and thus, by definition, have psychological distress[27,28]. Psychological distress is a term that encompasses symptoms such as anxiety, depression, somatization, and inability to cope[27,29]. At 1-year followup, we found that the mental health scores of both groups improved.

One potential limitation of our study is the 75% response rate among our participants; however, we observed no difference in responders and nonresponders in terms of age, sex, BMI, or baseline medical comorbidity, and we believe our conclusions remain valid. We chose to use the mental health score as the dependent variable in our regression model and not the MCS of the SF-36, as it has been validated as a general measure of distress and it is not influenced by a patient's physical health, as the MCS is[27,30].

Our study shows that a poorer mental health score prior to surgery predicted less satisfaction with surgery at 1-year followup. Interventions designed to reduce psychological distress should be studied to determine if they may improve subjective outcomes of patients following joint replacement surgery.

Table 4. Logistic regression modeling predicting patient dissatisfaction after surgery adjusted for age, gender, body mass index, Charlson Index, level of education, and procedure.

Measure	Preoperative OR for Predicting Patient Dissatisfaction (95% CI)	p
WOMAC total score	1.0 (0.99, 1.02)	0.40
WOMAC pain score	0.97 (0.90, 1.04)	0.38
Vitality	0.99 (0.98, 1.00)	0.23
General health	1.00 (0.99, 1.00)	0.86
Mental health	0.99 (0.98, 0.99)	0.006
Physical functioning	0.99 (0.99, 1.01)	0.67
Social functioning	1.00 (0.99, 1.01)	0.40

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